MONITORING PLAN

PROJECT NO. TV-15 (PTV-19b) SEDIMENT TRAPPING AT "THE JAWS"

ORIGINAL DATE: July 29, 2003
REVISED DATE: January 5, 2005

Project Description

The sediment trapping project at "The Jaws" (TV-15), from the 9th priority project list (PPL) of the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), comprises approximately 2,782 acres (1126 ha). Ninety-three percent, 2,600 acres (1052.5 ha) of the project is classified as open water, while the remaining 182 acres (73.5 ha) is classified as fresh marsh. The project is located near "The Jaws" in the northeast segment of West Cote Blanche Bay, approximately 10 miles southwest of Franklin, Louisiana in St. Mary Parish (figure 1).

The area has experienced major hydrologic changes since the construction of the Gulf Intracoastal Waterway (GIWW) in the 1920's and the diversion of Mississippi River water flow in 1963. In addition, the volume of fresh water flowing from the Mississippi River to the Atchafalaya River has steadily increased since 1839 when logjams were removed to make the river more navigable (Adams and Bauman 1980). The construction of the GIWW created a hydrologic connection between the project area and the Atchafalaya River. High Atchafalaya River stages allow the GIWW to carry a substantial flow of sediment laden fresh water into the area (Good et al. 1995). In 1963, the United States Army Corps of Engineers (USACE) regulated flow into the Atchafalaya River to 30 percent of the Mississippi River increasing the amount of sediment-laden water transported by the Atchafalaya River (Adams and Baumann 1980). As a result, many of the lakes within the Atchafalaya Basin Floodway system to the north of the project area have silted in, increasing the sediment load delivered to the Atchafalaya River Delta (Good et al. 1995). Sediment laden freshwater reaching the Gulf from the Atchafalaya River Outlet and the Wax Lake Outlet is also being delivered to the project via Cote Blanche Bay during southeast winds (Walker et al. 1997). Canal construction has greatly increased the tidal exchange between East and West Cote Blanche Bays and the interior marsh (Good et al. 1995).

These hydrologic changes are reflected in changes in salinities and marsh types. In 1949, the marshes surrounding "The Jaws" supported vegetation typical of brackish marsh dominated by *Schoenoplectus americanus* (chairmaker's bulrush) (O'Neil 1949). The area was again classified as brackish in 1968, with the primary plant species being bulrush, *Spartina patens* (saltmeadow cordgrass), *Schoenoplectus robustus* (saltmarsh bulrush), and *Ruppia maritima* (widgeongrass) (Chabreck et al. 1968). However, since 1978, the area has been classified as fresh marsh. Primary plant species include; *Panicum hemitomon* (maiden cane), water hyacinth, *Pontederia cordata* (pickerelweed), *Alternanthera philoxeroides* (alligatorweed), and *Sagittaria sp.* (bulltongue) (Chabreck and Linscombe 1978, 1988). Between 1949 and 1978, the area converted from brackish to fresh marsh as fresh water from the Atchafalaya River began reaching Vermilion Bay. The current plant community consists mainly of *Sagittaria platyphylla* (delta

duck potato), with lesser amounts of *Zizaniopsis miliacea* (southern wildrice), *Phragmites australis* (common reed), *Colocasia esculenta* (elephant ear), *Typha spp.* (cattail), and *Sesbania drummondii* (rattlebox) (United States Department of Agriculture, Natural Resources Conservation Service [USDA-NRCS] 2001). Approximately 10% of the shallow open water areas in the project are dominated (greater than 50% canopy coverage) by aquatic plants, such as *Vallisneria americana* (water celery), *Najas quadalupensis* (southern naiad), *Myriophyllum spicatum* (Eurasian watermilfoil), and *Heteranthera dubia* (star grass). *Eichhornia crassipes* (water hyacinth) is also prevalent, with large floating mats often developing in open water areas in the summer and autumn.

Marsh loss between 1957 and 1990 in the nearby Cote Blanche Hydrologic Restoration (TV-04) project area was calculated by USDA-NRCS personnel to be more than 2400 acres (971.5 ha), approximately 73 acres (29.5 ha)/yr during the 33 year span. Shoreline erosion was calculated to be 15 ft/yr (4.5 m/yr), based on planimetric analyses of aerial photography for this period.

The soils in the project area consist of brackish marsh clays, brackish marsh peat, and brackish marsh muck. They are described as alluvial silts and clays that have been reworked by waves and tides and deposited at elevations of as much as 6-8 in (15-20 cm) above the organic marsh soil (United States Department of Agriculture, Soil Conservation Service [USDA-SCS] 1959). These soils extend along the coastline of West Cote Blanche, East Cote Blanche, and Atchafalaya Bays from Little Bay to Wax Lake Pass.

Sediment availability is of fundamental importance to the project. With strong southeasterly winds, sediment-rich waters from the Atchafalaya Bay reach Vermilion Bay and deposit sediments in the proposed project area (Walker et al. 1997). In addition, the construction of the GIWW provides a conduit for fresh water and sediments from the Wax Lake Outlet. The project will induce sedimentation by reducing fetch and turbidity, resulting in the creation of marsh by sediment deposition in shallow open water areas. The project includes constructing terraces, dredging distributary channels, and planting vegetation on the terraces. Direct creation of marsh may occur due to the trapping of sediment and the creation and planting of terraces. This sediment trapping project is similar to the Little Vermilion Bay Sediment Trapping (TV-12 [PTV-19]) approved by the CWPPRA, PPL 5 (Castellanos 1998). Thus, the high sediment availability makes the project area a good site for creating marsh by trapping sediments from the GIWW and Cote Blanche Bay.

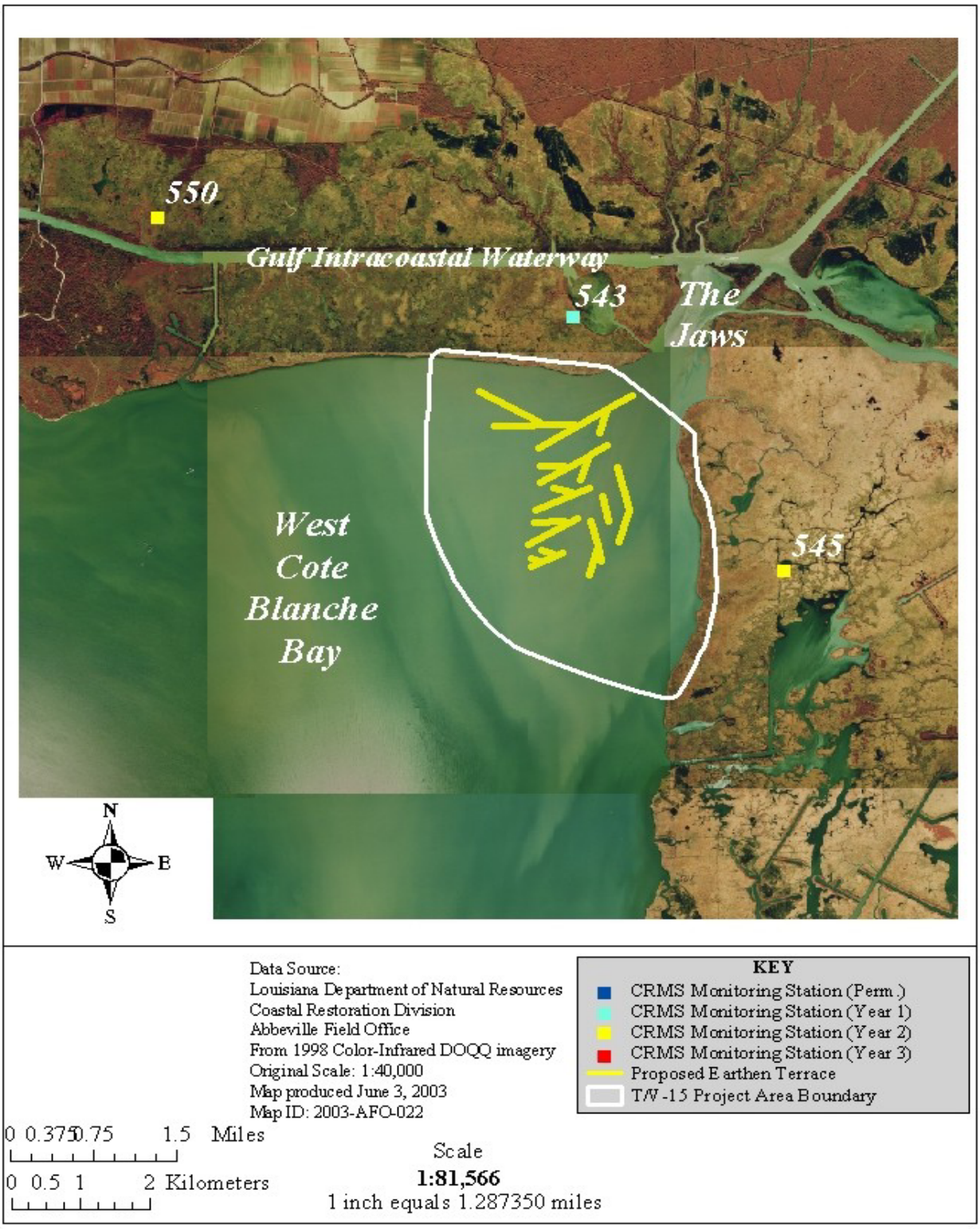

Figure 1. Project boundary, proposed terrace locations, and the location of proposed CRMS Wetland reference monitoring stations.

Project Goals and Strategies/Coast 2050 Strategies Addressed

CWPPRA projects are reviewed prior to authorization of construction funds for compatibility of project goals with those in Coast 2050 (Louisiana Coastal Wetlands Conservation and Restoration Task Force and Wetlands Conservation and Restoration Authority 1998), and for the probability that proposed restoration strategies will accomplish those goals. Project goals and strategies are provided to LDNR by the sponsoring federal agency through the Environmental Assessment (EA) and/or Wetland Value Assessment (WVA) for the project. The following goals and strategies for the sediment-trapping project at "The Jaws" were provided by the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (2002).

Project Goals:

1) Protect the north bank of "the Jaws" and existing marshes from shoreline erosion.
2) Create 1,821 acres (735 ha) of marsh habitat.
3) Greatly increase the quantity of submerged aquatic vegetation (SAV) habitat.

Project Strategies:

1) Construct earthen terraces in open water areas of the project to reduce fetch and wave energy, retain sediments, enhance SAV habitat, and create emergent marsh on terraces along distributary channels and on newly deposited soils.
2) Dredge distributary channels to enhance the amount of wetlands created by natural sediment deposition utilizing sediment-laden water from the Atchafalaya River and the GIWW to mimic a natural deltaic formation.
3) Plant *Schoenoplectus californicus* (California bulrush) or *Z. miliacea* to stabilize terraces and increase emergent marsh vegetation cover.

These project goals are consistent with the Coast 2050 common strategies of dedicated dredging to create, restore, or protect wetlands and the maintenance of Gulf, bay and lake shoreline integrity. The Region 3 specific strategies of increasing deltaic land building where feasible, maintaining shoreline integrity and stabilizing critical shoreline areas of Teche-Vermilion, Caillou, Terrebonne, and Timbalier Bay systems (including the gulf shoreline), and optimizing GIWW flows into marshes to minimize direct flow into bays are all addressed through the project. Terracing is another important common strategy of the Coast 2050 plan that will be used and evaluated in this project. The retention of sediments by the constructed terraces should "assure vertical accumulation to achieve sustainability", which is one of the strategic goals of Coast 2050. Sustained SAV growth, due to the reduction of turbidity, should improve system linkages, another important strategic goal of the Coast 2050 plan (Balkum 2000).

Project Features

At the time of this revision, project construction was completed and accurate dimensions are available. The project construction phase involved building 40,100 ft (12,223 m) of shallow

water earthen terraces with a 6 ft (1.8 m) top width, to an elevation of +4 ft (1.2 m) NAVD88. This was accomplished by dredging channels no wider than 50 ft (15.2 m) and no deeper than -12 ft (-3.7 m) NAVD88. Vegetative plantings will occur during the spring of 2005, with two rows of *S. californicus* or one row of *Z. miliacea* on each side of the terrace, to directly create 27 acres (10.9 ha) of wetlands. These terraces will reduce further shoreline erosion caused by wind driven wave action, and protect and enhance the growth of emergent and submersed aquatic vegetation. The target settled elevation of the terraces was derived from the average marsh elevation in the surrounding project area (Menard 2003). Final length, acreage, and settled height of the constructed terraces will be determined when as-built surveys are completed and documented by the LDNR Coastal Engineering Division (CED) in the Construction Completion Report. Terrace elevation is especially critical to project success, as the creation of wetland habitat is the desired outcome of construction and not upland or subaqueous structures.

Monitoring Goals

Priorities:

"The Jaws" (TV-15) project is classified as a sediment-trapping project. Construction of the earthen terraces via channel dredging will facilitate water and sediment flow into the areas adjacent to terraces, and may reduce turbidity within the project area by causing suspended sediments to fall out of the water column. Distributary channels are expected to increase freshwater and sediment flow from "The Jaws" and the GIWW into the project area. The project also proposes to reduce shoreline erosion rates and increase marsh habitat and SAV. There are insufficient resources for an evaluation of all anticipated project benefits. The emergent vegetation establishing on and near the constructed terraces and SAV may not be monitored. Any variation from expected results will be documented and evaluated.

Specific Monitoring Goals:

1) Evaluate land/water ratios in the project area.
2) Evaluate the condition of the established emergent and planted vegetation on the terraces.

Monitoring Strategies

The following monitoring element will provide the information necessary to evaluate the specific goals listed above:

CRMS Wetland Strategies

1. Land/Water Ratio — Aerial photography and satellite imagery will be collected for the entire coast through CRMS-*Wetlands*. The aerial photography will only be analyzed for CRMS-*Wetlands* stations. The satellite imagery will be analyzed to determine land and water areas for the entire coast. This imagery will be subset and used to qualitatively evaluate changes in land and water areas within the TV-15 project

area at a coarse (25m) resolution. Photography and satellite imagery for the Teche/Vermilion Basin will be collected and analyzed for years 2005, 2008, and every 3 years thereafter.

Anticipated Statistical Analyses and Hypotheses

The following describes hypotheses and associated statistical tests, if applicable, used to evaluate each of the quantifiable goals and thus the effectiveness of the project.

1. Land/Water Ratio:

   Descriptive and summary statistics on historical data, as part of the CRMS-*Wetlands* strategy (for 1956, 1978, 1988, and for any subsequent years) and basin-level data from aerial photography and/or digital satellite imagery collected pre- and post-construction will be used, along with GIS interpretations of these data sets, to evaluate marsh to open water ratios and changes in the rate of marsh loss/gain in the project area.

Notes:

1. Proposed Implementation:

Start construction	July 14, 2004
End terrace construction	December 7, 2004
Planting	Spring 2005

2. NOAA Point of Contact:	John Foret	(337) 291-2107
3. DNR Project Manager:	Stan Aucoin	(337) 482-0681
DNR Monitoring Manager:	Justin Price	(337) 482-0658
DNR RTS Assistant:	Kyle Balkum	(225) 342-4122

4. Periodic Operations, Maintenance, and Monitoring reports will describe the status and effectiveness of the project.

5. Bathymetry was surveyed just after project completion. Elevation of the water bottom sediments will be determined beginning at the approximate center of each terrace and measured at regular intervals. Further surveys will be conducted as deemed necessary by the Coastal Engineering Division at the one maintenance event scheduled for this project at year 7-10. These surveys will be carried out by a professional engineering firm as part of the Operation, Maintenance, and Rehabilitation Plan (O&M) for the project. Results will be reported if sediment is monitored.

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